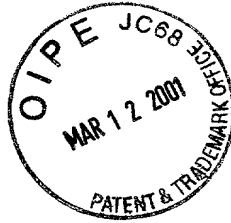


**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**



In re Application of:

XU et al

Application No.: 09/759,241

Art Unit: Unassigned

Filed: January 16, 2001

Examiner: Unassigned

For: COMPOSITE  
TEXTILE MATERIAL

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, D. C. 20231

Dear Sir:

Prior to the examination of the above-identified patent application, please enter the following amendments and consider the following remarks.

**IN THE SPECIFICATION**

Replace the paragraph beginning at page 1, line 11; with:

The invention relates more particularly to composite textile materials that have applications in moisture management. Basically, there is an on-going requirement to make clothing, especially sports clothing, diapers and incontinence apparel and so forth more comfortable and healthier to wear and use, even though considerable moisture or liquids may be liberated by the wearer in normal use. It is known to provide composite textile materials that comprise distinct layers of materials having respective appropriate

characteristics so that moisture, or liquid, migrates or drains quickly away from an inner surface of the material in contact with the body of a wearer. The liquid may be retained in a second outer layer in the case of a diaper or evaporate normally from an outer surface of the material where there is only one layer, in the case of sports clothing.

Replace the paragraph beginning at page 2, line 18, with:

According to the invention there is provided a composite textile fabric for use in moisture management of textiles and garments, the composite fabric comprising a generally uniformly integrated fabric layer with an inner exposed surface that is predominantly hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric forms a one-way liquid transport system extending away from the inner surface towards the outer surface.

Replace the paragraph beginning at page 3, line 5, with:

A re-usable diaper may have an inner layer of the composite textile fabric, a middle layer of treated cotton fabric, and an outer layer of a water-proof material.

Replace the paragraph beginning at page 3, line 10, with:

A diaper may have an inner layer of the composite textile fabric, a middle layer of disposable absorbent material, and an outer layer of a waterproof material.

Replace the paragraph beginning at page 3, line 15, with:

Clothing that may include the composite textile fabric layer may be boxer shorts or long pants.

Replace the paragraph beginning at page 3, line 18, with:

A mattress cover may include the composite textile fabric layer.

Replace the paragraph beginning at page 4 line 22, with:

Composite textile fabrics and articles made with materials according to the invention comprise a generally uniformly integrated layer that includes a combination of a hydrophobic material and a hydrophilic material. The combination can be made by a number of well-practiced techniques including knitting, weaving, and other means, that are used for joining or retaining materials together to form a fabric. In the composite fabric, an inner layer, that normally contacts a body of a user, is predominately a hydrophobic textile material such as polypropylene. In contrast, the outer layer is predominately a hydrophilic material. Typically, the inner surface has, over its inner surface, a number of very small areas of the hydrophilic material that are distributed evenly in the surface of the outer layer. The small areas, when totalled together, make up typically about 25% of the overall area of the inner surface. When the inner surface is wetted, moisture migrates into the composite fabric via paths formed by hydrophilic material and away from the body of the user.

Replace the paragraph beginning at page 6, line 1, with:

It will be appreciated that the small areas of hydrophilic material may comprise a wide range of percentages of the overall exposed inner surface area of the fabric. Whereas 25% is a generally satisfactory and efficient value, the percentage may be considerably higher or lower according to the required use and material or types of those materials that make up the hydrophobic and hydrophilic parts.

Replace the paragraph beginning at page 6, line 10, with:

Referring to the drawings, in Figure 1 a typical arrangement of a diaper is shown. The composite material is provided as an inner layer 10 of hydrophobic material 10A and hydrophilic material 10B. In practice, the material 10A is actually uniformly "impregnated" with hydrophilic material 10B by weaving, knitting, or any other techniques, so that an exposed upper surface of the layer 10 comprises small areas of the hydrophilic material. The small areas provide passage or ducts for moisture, or liquids to migrate from the upper surface into the bulk of the hydrophilic material 10B of the composite layer. Because the passages each have a small cross-section and are surrounded by hydrophobic material, the composite layer 10 acts as a one-way liquid transport system. An outer absorbent storage layer 12 is provided to collect water from the bulk of the material 10B and a waterproof layer or cover 14 prevents moisture or water from dispersing out of the diaper in an otherwise conventional manner.

Replace the paragraph beginning at page 7, line 1, with:

Generally stated, there is no tendency or likelihood of liquid passing towards the exposed upper surface of the layer 10 material 10B to the material 10A, even under gravity, during use, and so a wearer's skin normally remains dry.

Replace the paragraph beginning at page 7, line 7, with:

The layer 10 is re-usable (i.e. washable). For reusable diapers, the layer 12 can be also be made of reusable materials. On the other hand, where desired, the layer 12 can be made of disposable material and used only once. In this situation, the layer 12 is preferably separately applied or attached to the layer 10 so that the layer 10 can be reused with a new different layer 12.

Replace the paragraph beginning at page 7, line 16, with:

In another embodiment, the layer 12 is, in effect, combined with the layer 10, such that when the materials 10A and 10B are knitted or woven together, the layer 12 forms part of the composite layer 10 and is knitted or woven into the layer 10. In that case, the inner surface is predominantly a hydrophobic material with a number of small exposed areas of the hydrophilic material.

Replace the paragraph beginning at page 7, line 25, with:

In any event, the composite layer represents the main departure from the prior art and can be used separately or as part of a diaper, an incontinence bed cover, underpants, or underslips, and so forth. For sportswear, the composite material alone can be made into an article or can be part of an article of clothing. Moisture that migrates into the material 10B will evaporate into the atmosphere in normal use and the skin of the wearer will remain dry and comfortable.

Replace the paragraph beginning at page 8, line 8, with:

In Figure 2, part of the upper surface of composite material layer 10 is shown. A strand of hydrophilic material 15 is interspaced with strands of hydrophilic material 16 so that the area (overall) of the upper surface is about 25% hydrophilic material. Each downward directed part of the strand 15 shown in the Figure represents a narrow passage or duct to transport moisture into the hydrophilic material that predominantly constitutes the lower surface of the composite layer.

Replace the paragraph beginning at page 8, line 19, with:

The composite layer is formed by knitting, and a suitable knitting structure is shown in Figure 3. The composite material is knitted on a multi-function cylinder, dial and two track knitting machine. Two filament yarns are used. The first yarn is a

polypropylene filament yarn with a tenacity of 17.4 tex (double yarn of 8.7 tex) and the second yarn is polyester (Coolmax) filament yarn with a tenacity of 8.5 tex.

Replace the paragraph beginning at page 9, line 1, with:

In Figure 4, the diaper is generally conventional but is provided with a layer 16 of the composite material. The layer 17 may be permanently attached to a re-usable diaper or insertable into a suitable pocket, for example, for a disposable diaper. The layer 17 itself is reusable.

Replace the paragraph beginning at page 9, line 8, with:

In Figure 5, a removable layer 18 of composite material is arranged to fit into or centrally over an incontinence draw sheet or mattress cover formed otherwise of cotton fabric 19 with a central absorbent layer 20.

Replace the paragraph beginning at page 9, line 13, with:

The composite material may also be used in a similar manner, preferably as an insertable layer in clothing, such as boxer shorts shown in Figure 6 or long pants shown in Figure 7.

Replace the paragraph beginning at page 9, line 18, with:

It will be appreciated that the term hydrophobic and hydrophilic are comparative terms and depend upon selection of fibres and yarn with different surface tension, contact angle, shape of cross section, diameters of fibres, chemical and physical finishing, and so forth. Thus, it will be understood that the terms "hydrophobic" and "hydrophilic" are used in the specification and claims as relative terms. This means that the composite textile fabric includes materials that are hydrophobic and hydrophilic relative to one

another rather than necessarily having such properties in comparison to a norm or some industrial standard, for example.

## IN THE CLAIMS

Replace the existing claims with:

1. (Amended) A composite textile fabric comprising a generally uniformly integrated fabric layer including an inner exposed surface that is predominantly hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric provides a one-way liquid transport system, transporting liquid away from the inner surface towards the outer surface.
2. (Amended) The composite fabric according to Claim 1, in which the hydrophilic material is polypropylene.
3. (Amended) The composite fabric according to Claim 1, in which the hydrophilic material is one of polyester and cotton.
4. (Amended) A re-usable diaper comprising an inner layer of a fabric comprising a generally uniformly integrated fabric layer including an inner exposed surface that is predominantly hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric provides a one-way liquid transport system, transporting liquid away from the inner surface towards the outer surface, a middle layer of a treated cotton fabric, and an outer layer of a waterproof material.
5. (Amended) A diaper comprising an inner layer formed of the fabric comprising a generally uniformly integrated fabric layer including an inner exposed surface that is predominantly hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric provides a one-way liquid

transport system, transporting liquid away from the inner surface towards the outer surface, a middle layer of a disposable absorbent material, and an outer layer of a waterproof material.

6. (Amended) Clothing including the composite textile fabric layer according to Claim 1.

7. (Amended) An incontinence mattress cover including a composite textile fabric layer according to Claim I.

8. (Amended) Clothing according to Claim 6 comprising boxer shorts.

9. (Amended) Clothing according to Claim 6 comprising long pants.

#### IN THE ABSTRACT

Replace the abstract with :

#### Abstract

A composite textile fabric includes a composite layer of a hydrophobic material and a layer of a hydrophilic material knitted or otherwise formed together. The composite layer has an upper surface of small exposed areas of the hydrophilic material covering a total area about 25% of the overall area of the upper surface. The composite layer provides one way liquid transport for moisture, extending from the upper surface towards a lower surface of the composite layer.

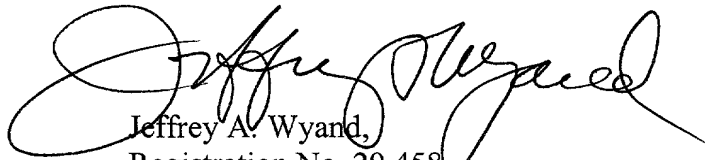


**REMARKS**

The foregoing amendments are made to improve the form of the patent application.  
No new matter has been added and entry is respectfully requested.  
A favorable Action on the merits is solicited.

Respectfully submitted,

LEYDIG, VOIT & MAYER, LTD.

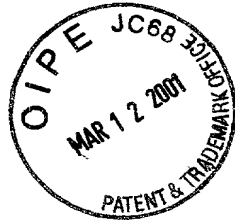
  
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Date: March 12, 2001  
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TEXTILE MATERIAL

**SPECIFICATION, CLAIMS AND  
ABSTRACT AS PRELIMINARILY AMENDED**

Amendments to the paragraph beginning at page 1, line 11:

The invention relates more particularly to composite textile materials that have applications in moisture management. Basically, there is an on-going requirement to make clothing, especially sports clothing, diapers and ~~incontinent~~ incontinence apparel and so forth more comfortable and healthier to wear and use, even though considerable moisture or liquids may be liberated by the wearer in normal use. It is known to provide composite textile materials that comprise distinct layers of materials having respective appropriate characteristics so that moisture, or liquid, migrates or drains quickly away from an inner surface of the material in contact with the body of a wearer. The liquid may be retained in a second outer layer in the case of a diaper or evaporate normally from an outer surface of the material where there is only one layer, in the case of sports clothing, ~~say~~.

Amendments to the paragraph beginning at page 2, line 18:

According to the invention there is provided a composite textile fabric for use in moisture management of textiles and garments, the composite fabric comprising a generally uniformly integrated fabric layer ~~formed~~ with an inner exposed surface that is predominantly hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric forms a one-way liquid transport system extending away from the inner surface towards the outer surface.

Amendments to the paragraph beginning at page 3, line 5:

A re-usable diaper may ~~be provided having~~ have an inner layer ~~formed~~ of the composite textile fabric, a middle layer ~~formed~~ of treated cotton ~~fabrics~~ fabric, and an outer layer ~~formed~~ of a water-proof material.

Amendments to the paragraph beginning at page 3, line 10:

A diaper may ~~be provided having~~ have an inner layer ~~formed~~ of the composite textile fabric, a middle layer ~~formed~~ of disposable absorbent material, and an outer layer ~~formed~~ of a waterproof material.

Amendments to the paragraph beginning at page 3, line 15:

Clothing that may ~~be provided with or formed of~~ include the composite textile fabric layer, ~~such as~~ may be boxer shorts or long pants.

Amendments to the paragraph beginning at page 3, line 18:

~~An incontinent~~ A mattress cover ~~including~~ may ~~be provided with~~ include the composite textile fabric layer.

Amendments to the paragraph beginning at page 4 line 22:

Composite textile fabrics and articles made with ~~such~~ materials according to the invention comprise a generally uniformly integrated layer that ~~is formed by~~ includes a combination of a hydrophobic material and a hydrophilic material. The combination can be made by a number of well-practiced techniques including knitting, weaving, and other means, that are used for joining or retaining materials together to form a fabric. In the ~~formed~~ composite fabric, an inner layer, that normally contacts ~~against~~ a body of a user, is ~~made up~~ predominately ~~of~~ a hydrophobic textile material such as polypropylene. In contrast, the outer layer is ~~made up~~ predominately ~~of~~ a hydrophilic material. Typically, the inner surface ~~is constituted~~ has, over its inner surface ~~with~~, a number of very small areas of the hydrophilic material that are distributed evenly in the surface of the outer layer. The small areas, when totalled together, make up typically about 25% of the overall area of the inner surface. When the inner surface is wetted, moisture migrates into the composite fabric via paths formed by hydrophilic material and away from the body of the user.

Amendments to the paragraph beginning at page 6, line 1:

It will be appreciated that the small areas of hydrophilic material may comprise a wide range of percentages of the overall exposed inner surface area of the fabric. Whereas 25% is a generally satisfactory and efficient value, the percentage may be considerably higher or lower according to the required use and material or types of those materials that make up the hydrophobic and hydrophilic parts.

Amendments to the paragraph beginning at page 6, line 10:

Referring to the drawings, in Figure 1 a typical arrangement of a diaper is shown. The composite material is provided as an inner layer ~~10 formed~~ of hydrophobic material 10A and hydrophilic material 10B. In practice, the material 10A is actually uniformly “impregnated” with hydrophilic material 10B by weaving, knitting, or any other

techniques, so that an exposed upper surface of the layer 10 comprises small areas of the hydrophilic material. The small areas provide passage or ducts for moisture, or liquids to migrate from the upper surface into the bulk of the hydrophilic material 10B of the composite layer. Because the passages each have a small cross-section and are surrounded by hydrophobic material, the composite layer 10 acts as a one-way liquid transport system. An outer absorbent storage layer 12 is provided to collect water from the bulk of the material 10B and a waterproof layer or cover 14 prevents moisture or water from dispersing out of the diaper in an otherwise conventional manner.

Amendments to the paragraph beginning at page 7, line 1:

Generally stated, there is no tendency or likelihood of liquid passing towards the exposed upper surface of the layer 10 material 10B to the material 10A, even under gravity, during use, and so ~~a surface of~~ a wearer's skin normally remains dry.

Amendments to the paragraph beginning at page 7, line 7:

The layer 10 is re-usable (i.e. washable). For reusable diapers, the layer 12 can be also be made of reusable materials. On the other hand, where desired, the layer 12 can be made of disposable material and used only once. In this situation, the layer 12 is preferably separately applied or attached to the layer 10 ~~and so that the layer 10 can be~~ reused with a new different layer 12.

Amendments to the paragraph beginning at page 7, line 16:

In another embodiment, the layer 12 is, in effect, combined with the layer 10, such that when the materials 10A and 10B are knitted or woven together, the layer 12 forms part of the composite layer 10 and is knitted or 20 woven into the layer 10. In that case, the inner surface is ~~formed as before so as to be~~ predominantly ~~made up of~~ a hydrophobic material with a number of small exposed areas ~~formed by~~ of the hydrophilic material.

Amendments to the paragraph beginning at page 7, line 25:

In any event, the composite layer represents the main departure from the prior art and can be used separately or as part of a diaper, an ~~incontinent~~ incontinence bed cover, ~~underparts~~ underpants, or ~~underslips~~ underslips, and so forth. For sportswear, the composite material alone can be made ~~up~~ into an article or can be part of an article of clothing. Moisture that migrates into the material 10B will evaporate into the atmosphere in normal use and ~~surface of~~ the skin of the wearer will remain dry and comfortable.

Amendments to the paragraph beginning at page 8, line 8:

In Figure 2, part of the upper surface of composite material layer 10 is shown. A strand of hydrophilic material 15 is interspaced with strands of hydrophilic material 16 so that the area (overall) of the upper surface is ~~constituted of~~ about 25% hydrophilic material. Each downward directed part of the strand 15 shown in the Figure represents a narrow passage or duct to transport moisture into the hydrophilic material that predominantly constitutes the lower surface of the composite layer.

Amendments to the paragraph beginning at page 8, line 19:

~~Where the~~ The composite layer is formed by knitting, and a suitable knitting structure is shown in Figure 3. The composite material is knitted on a multi-function cylinder ~~and~~ dial and two track knitting machine. Two filament yarns are used. The first yarn is a polypropylene filament yarn with a tenacity of 17.4 tex (double yarn of 8.7 tex) and the second yarn is polyester (Coolmax) filament yarn with a tenacity of 8.5 tex.

Amendments to the paragraph beginning at page 9, line 1:

In Figure 4, the diaper is generally conventional but is provided with a layer 16 of the composite material. The layer 17 may be permanently attached to a re-usable diaper

or insertable into a suitable pocket, for example, for a disposable diaper. The layer 17 itself is reusable.

Amendments to the paragraph beginning at page 9, line 8:

In Figure 5, a removable layer 18 of composite material is arranged to fit ~~to~~into or centrally over an ~~incontinent~~ incontinence draw sheet or mattress cover formed otherwise of cotton fabric 19 with a central absorbent layer 20.

Amendments to the paragraph beginning at page 9, line 13:

The composite material may also be used in a similar manner, preferably as an insertable layer in clothing, such as boxer shorts shown in Figure 6 or long pants shown in Figure 7.

Amendments to the paragraph beginning at page 9, line 18:

It will be appreciated that the term hydrophobic and hydrophilic are comparative terms and depend upon selection of fibres and yarn with different surface tension, contact angle, shape of cross section, diameters of fibres, chemical and physical finishing, and so forth. Thus, it will be understood that the terms "hydrophobic" and "hydrophilic" are used in the specification and claims as relative terms. This means that the composite textile fabric ~~is made up of~~ includes materials that are hydrophobic and hydrophilic relative to one another rather than necessarily having such properties in comparison to a norm or some industrial standard, for example.

Amendments to existing claims:

1. (Amended) A composite textile fabric ~~for use in moisture management of textiles and garments, the composite fabric~~ comprising a generally uniformly integrated fabric layer ~~formed with~~ including an inner exposed surface that is predominantly

hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric ~~forms~~ provides a one-way liquid transport system ~~extending,~~ transporting liquid away from the inner surface towards the outer surface.

2. (Amended) ~~A~~The composite fabric according to Claim 1, in which the hydrophilic material is polypropylene.

3. (Amended) ~~A~~The composite fabric ~~fabric~~ according to Claim 1, in which the hydrophilic material is one of polyester and cotton.

4. (Amended) A re-usable diaper comprising an inner layer ~~formed of the a fabric according to Claim 1,~~ comprising a generally uniformly integrated fabric layer including an inner exposed surface that is predominantly hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric provides a one-way liquid transport system, transporting liquid away from the inner surface towards the outer surface, a middle layer ~~formed of a treated cotton fabrics fabric,~~ and an outer layer ~~formed of a waterproof material.~~

5. (Amended) A diaper comprising an inner layer formed of the fabric ~~according to Claim 1,~~ comprising a generally uniformly integrated fabric layer including an inner exposed surface that is predominantly hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric provides a one-way liquid transport system, transporting liquid away from the inner surface towards the outer surface, a middle layer ~~formed of a disposable absorbent material,~~ and an outer layer ~~formed of a waterproof material.~~

6. (Amended) Clothing ~~provided with~~ including the composite textile fabric layer according to Claim 1.

7. (Amended) An ~~incontinent~~ incontinence mattress cover including a composite textile fabric layer according to Claim I.



8. (Amended) Clothing according to Claim ~~7~~ 6 comprising boxer shorts.

9. (Amended) Clothing according to Claim ~~7~~ 6 comprising long pants.

Amendments to the abstract:

#### Abstract

A composite textile fabric includes a composite layer ~~10 formed~~ of a hydrophobic ~~10A material~~ and a layer of a hydrophilic material ~~10B~~ knitted or otherwise formed together. The composite layer ~~10 is formed such that~~ has an upper surface ~~consists of a plurality of small exposed areas of the hydrophilic material making up in covering a total area about 25% of the overall area of the upper surface.~~ The composite layer ~~10 acts as a provides~~ one way liquid transport for moisture, extending ~~away~~ from the upper surface towards a lower surface of the composite layer ~~10~~.

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**CLAIMS PENDING AFTER PRELIMINARY AMENDMENT**

1. A composite textile fabric comprising a generally uniformly integrated fabric layer including an inner exposed surface that is predominantly hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric provides a one-way liquid transport system, transporting liquid away from the inner surface towards the outer surface.

2. The composite fabric according to Claim 1, in which the hydrophilic material is polypropylene.

3. The composite fabric according to Claim 1, in which the hydrophilic material is one of polyester and cotton.

4. A re-usable diaper comprising an inner layer of a fabric comprising a generally uniformly integrated fabric layer including an inner exposed surface that is predominantly hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric provides a one-way liquid transport system, transporting liquid away from the inner surface towards the outer surface, a middle layer of a treated cotton fabric, and an outer layer of a waterproof material.

5. A diaper comprising an inner layer formed of the fabric comprising a generally uniformly integrated fabric layer including an inner exposed surface that is predominantly hydrophobic material and an outer surface that is predominantly hydrophilic material, whereby the fabric provides a one-way liquid transport system, transporting liquid away from the inner surface towards the outer surface, a middle layer of a disposable absorbent material, and an outer layer of a waterproof material.

6. Clothing including the composite textile fabric layer according to Claim 1.

7. An incontinence mattress cover including a composite textile fabric layer according to Claim I.

8. Clothing according to Claim 6 comprising boxer shorts.

9. Clothing according to Claim 6 comprising long pants.